
Space Weather Forecast

Issued on Tuesday, 25 April 2023 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Waning CME effects with G1-G2 Minor-Moderate Storm risk Day 1 (25 Apr), further CME possible Day 2 into Day 3 (26-27 Apr) with G1-G2 risk again. Slight chance of M-class flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only minor Common-class flares observed. There are currently seven sunspot regions on the visible disc. The largest region is approaching the northwest limb and is no longer fully visible, so the current classification will be maintained as it rotates off. A region in the southeast is the second largest and remains generally stable. The remaining sunspot regions are all generally small and simple, the exception being a new region developing quickly near another region in the southeast. Further development of this region will be closely monitored.

An eruption occurred from near south centre disc, starting around 24/1300 UTC. The Coronal Mass Ejection (CME) has been observed in coronagraph imagery heading mostly south, but an Earth directed component is possible, with this potentially reaching Earth early on 27 April. Assessment is still ongoing.

Solar Wind / Geomagnetic Activity: The solar wind showed ongoing CME effects after the arrival at 23/1700 UTC. The wind speed was initially elevated but soon reached strong levels, peaking at 630 km/s, then eased back to slightly elevated levels near 470 km/s. The Interplanetary Magnetic Field was initially strong or very strong with a peak observed at 24/0105 UTC as we entered the magnetic cloud associated with the CME. It has since declined back to moderate levels. The north-south component was initially strongly variable, then falling to very strong southward directed levels, with a minimum observed at 24/0106 UTC. It rotated to become strongly northward directed during the day, and is now moderately northward directed. Geomagnetic activity started the period at G3-G4 Strong to Severe Storm (Kp 7-8) levels until 24/0900 UTC, gradually easing, and is now at Quiet to Unsettled levels. Aurora was reported across the whole UK during the early hours of the 24 April.

Energetic Particles / Solar Radiation: Solar radiation started the period slightly above background levels after the CME arrival, but soon subsided to background.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is most likely to remain Low, with a slight chance of becoming Moderate.

Solar Wind / Geomagnetic Activity: Earth is currently experiencing impacts from the CME which left the Sun on 21 Apr, with solar winds currently at elevated levels. Another eruption has occurred from near south centre disc, producing a CME. An Earth directed component is possible, with this potentially reaching Earth either late on 26 April or early on 27 April. Solar
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winds are likely to gradually ease through Day 1 (25 Apr), probably becoming slow during Day 2 (26 Apr) as the current CME effects wane. A coronal hole fast wind is likely to arrive during Day 2, with wind speeds up to 550-600 km/s.

Geomagnetic activity is currently muted due to a northward oriented magnetic field, however further G1-G2/Minor-Moderate Storm intervals are possible if it rotates southwards again, perhaps mainly when Earth exits the CME influence. Activity is then expected to be mostly Quiet to Unsettled by Day 2, until the potential CME/fast wind arrivals later Day 2 or early Day 3, when activity may increase once again to become Active to G1/Minor Storm, with a slight chance of G2/Moderate Storm intervals.

Energetic Particles / Solar Radiation: Solar radiation is currently at background levels, with a slight chance of rising to reach the S1/Minor Storm level, should any effects occur from the recent CME which left the Sun, or with any larger flares.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	40	30	50	10
Strong	G3	Yes	1	1	5	1
Severe	G4	Yes	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	15	15	15	15
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	3
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)